

Translation from Bulgarian



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**DIRECTORATE FOR AIRCRAFT, MARITIME AND RAILWAY
ACCIDENT INVESTIGATION
(DAMRAI)**

FINAL REPORT

on

technical investigation of a railway accident which has occurred on 04.10.2010 around 07:55 AM between the stations in Dragoman and Dragoil, at km 47+796 – frontal collision between employees service train # 10352 headed from Dragoman to Dimitrovgrad RS and the international express train # 293 Belgrade-Sofia.



November 2010

FINAL REPORT

Regarding technical investigation of a railway accident, which has occurred on 04.10.2010 around 07:55 AM between the stations in Dragoman and Dragoil, at km 47+796 – frontal collision between employee's service train # 10352 moving from Dragoman to Dimitrovgrad RS and the international express train # 293 Belgrade-Sofia.

Pursuant to Order No. ПД-08-526 / 05.10.2010 of the Minister of Transport, Information Technology and Communications, a commission has been appointed for technical investigation of a railway accident, with the task to investigate and establish the causes of the accident and present a report with safety recommendations resulting from this investigation.

The investigation commission carried out a direct meeting between all persons involved in the accident and analyzed the report of the Operative Group and the required supplementary documents clarifying the facts and circumstances of the accident.

1. Facts and circumstances ascertained during the investigation.

During the shift on 03/04.10.2010, the officer on duty for the traffic organization – first person, at Dragoman station admits at 06:35 AM on 2nd receiving/dispatching track of Dragoman station the diesel engine # 06-60 denominated as train # 11920 ordered by the 'Operative Management of Rail-traffic' (OMR), Sofia, with planned route Sofia-Stanyantzi, which should wait at Dragoman station the arrival of a new shift 'technician, mechanic/inspector of carriages' (TMIC). Following instructions by the traffic organization officer, shunting is performed at the Dragoil side of the station from track one to track four for the purpose of making up of 'employees service train' (EST) # 10352 with electric engine # 45-152 and one passenger car B₄ # 505220176067. The shunt is performed by a shunting team of 'Freight Traffic Company' (FTC), Sofia. After train EST # 10352 has been parked on track four, re-parking of diesel engine # 06-60 has been done from track two to track four in front of EST # 10352, 10-15 m in front of the train on the Dragoil side.

At 07:19 AM, arrives passenger train # 10204 on the second track of Dragoman station. The new shift for electric engine # 45-152, technician, mechanic/inspector of carriages and the new shift of traffic organization officer at Dragoman station arrive by this train.

At 07:21 at Dragoman station, the traffic organization officer on duty – first person in the stepping out shift, hands over the duty with the log for documenting the train traffic Form DP-3 to the traffic organization officer – first person of the next shift. He records in the log that EST # 10352 is parked on track four, but fails to record the diesel engine # 06-60, parked in front of it on the Dragoil side. The technician, mechanic/inspector of carriages, upon arrival at Dragoman station, gets on engine # 06-60, contacts by his mobile phone the traffic organization officer of the station and notifies him, that he is about to depart to Stanyantzi station.

At 07:23 AM the driver of the diesel engine moves it ahead to the front distance sign (without permission from the traffic organization officer), so he could see the exit traffic lights.

At 07:32 AM the train dispatcher of OMR, Sofia instructs the traffic organization officer on duty that the diesel engine # 06-60 should be hitched at the tail of train # 44151 which should depart to Plovdiv, but this instruction has not been observed by the traffic organization officer on duty.

After securing with Dragoil station the movement of EST # 10352 by 'semiautomatic blockage' (SAB), at 07:40 the traffic organization officer on duty undertakes action with 'ensuring equipment' (EE) for dispatching EST # 10352 from fourth receiving/dispatching track to Dragoil

station, unaware of the diesel engine # 06-60 in front of it. Seeing the open exit signal and without receiving departure order personally given by the traffic organization officer on duty with his truncheon, the driver of the diesel engine # 06-60 pulls out to Dragoil station at 07:40 AM. In the same time, the traffic organization officer on duty serves the travel documents to the engine driver at 07:41, natural list and VP-11, checks the engine's clocks and signs the travel ticket of the engine crew. At about 07:43 AM the traffic organization officer – second person, returns from the station area back to the control room and finds out that the EE is ringing, the semiautomatic blockage is engaged and the exit signal is shut down for EST # 10352, and informs accordingly the first person . The traffic organization officer on duty returns to the control room and finds that the exit sign for track four is closed and notifies by phone the EE mechanics on duty at the station about the status of the semiautomatic blockage. Then he goes back to the engineers of EST # 10352 and begins persuading them to pull out at closed exit signal and arranged route, thinking that the section between the stations is free, yet without using the telephone method of ensuring the train's travel and without giving a written order for traffic under special conditions Form II-A. The engineers of EST # 10352 agree with the proposal to pull out despite the closed exit signal and without written order for traffic under special conditions Form II-A. The traffic organization officer on duty goes back to the office room and observes the train leaving the station on the indicator of the EE and indicates departure of EST # 10352 to Dragoil station at 07:45 being unaware that the section between the stations is already occupied by the previously departed engine.

The traffic organization officer on duty has not received spoken reports about the departure of diesel engine # 06-60 and train # 10352 from post # 2 because of the late appearance for work of the new shift switchman at the post and the relief of the previous shift switchwoman by the organization of traffic officer on duty (first person).

According to the explanations of the crew of electric engine # 45-152 of the EST # 10352, the departure from the station has been done under 'departure order' given with a truncheon disk by the traffic organization officer on duty at closed exit signal.

The traffic organization officer on duty at Dragoil station undertakes action on receiving EST # 10352 and opens the entry signal to track two, unaware that it is preceded by engine # 06-60 which enters Dragoil station on track two. She admits the train in accordance with the indications of the safety equipment without receiving a report from the switchman regarding the integrity of EST # 10352 from Dragoman and without meeting the train personally on the track. After vacation of the isolated section of track two by diesel engine # 06-60, the entry route is unlocked and the officer releases the semiautomatic blockage at 07:51 by button 'track arrival' (TA) without checking in unambiguous way the integrity of the train/vehicle which has entered the station and whether the section between the stations is unoccupied.

The trip of the international fast train # 293 is checked with Dragoman station through the semiautomatic blockage. The traffic organization officer on duty at Dragoil station allows, through the stations safety equipment, transit of the international fast train # 293 along the receiving/dispatching track one to Dragoman station. Train # 293 enters the section between Dragoil and Dragoman facing EST # 10352. Exchanging a recorded phone call to Dragoman station for reporting departure of train # 293, the traffic organization officer on duty at Dragoil station asks Dragoman station 'what shifts have you dispatched, as only a diesel arrived here?'. Following this conversation, the traffic organization officer on duty (first person) at Dragoman station immediately calls by the company mobile telephone the driver of engine EST # 10352 to immediately pull off the train, and, at 07:52 AM – the train dispatcher, ordering him to switch off the current in the 'contact grid' (CG) between the stations (instead of doing it himself).

The train dispatcher gives orders to the power dispatcher, who has been next to him, to cut down the power.

At 07:55 the power dispatcher reports cut down of the power in the CG, according to the report by the person on duty at substation Aldomirovtzi.

The readings of the tachometry tape of electric engine # 45-152 indicate that both trains have met and collided frontally at about 7:55 AM at km 47+796. The impact did not cause derailment of the moving stock. Due to the accident, large material damage has been incurred and passengers in both trains and the engine team of train # 293 have been injured.

2. Officers involved in the event.

2.1 Engine crews:

2.1.1. 'engine driver' of electric engine # 45-156 – employee of engine yard Sofia, part of BDZ EAD – 27 years of professional experience;

2.1.2. 'assistant engine driver' of electric engine # 45-156 – employee of engine yard Sofia, part of BDZ EAD – 4 years and 3 months of professional experience;

2.1.3 'engine driver' of electric engine # 45-152 – employee of engine yard Sofia, part of BDZ EAD – 3 years and 2 months of professional experience;

2.1.4. 'assistant engine driver' of electric engine # 45-152 – employee of engine yard Sofia, part of BDZ EAD – 20 years of professional experience;

2.1.5. 'engine driver' of diesel engine # 06-60 – employee of engine yard Sofia, part of BDZ EAD – 27 years and 9 months of professional experience;

2.1.6. 'assistant engine driver' of diesel engine # 06-60 – employee of engine yard Sofia, part of BDZ EAD – 26 years of professional experience;

2.2 Crew of train # 293:

2.2.1. 'Train master' of train # 293 – employed by the Sofia RCPT at 'BDZ – Passenger Transport' EOOD – professional experience 17 years and 5 months;

2.2.2. 'train conductor' of train # 293 – employee of the RCPT-Sofia at BDZ Passenger Transport EOOD – 5 years of professional experience;

2.2.3. "conductor sleeping cars" of train # 293 – employed by the RCPT – Sofia at BDZ – Passenger Transport EOOD – professional experience 15 years and 5 months;

2.3 Railway station personnel:

2.3.1 'trains dispatcher' – employee of UDWGD Sofia at the NC 'National Company Railway Infrastructure' – 30 years of professional experience;

2.3.2. 'traffic organization officer' (first person) of the stepping-off shift at Dragoman station - employee of UDWGD Sofia at the National Railway Infrastructure Company – 3 years and 4 months professional experience;

2.3.3. 'traffic organization officer' (first person) of the taking over shift at Dragoman station - employee of UDWGD Sofia at the National Railway Infrastructure Company – 8 years and 5 months professional experience;

2.3.4. 'traffic organization officer' second person of the taking over shift at Dragoman station - employee of UDWGD Sofia at the National Railway Infrastructure Company – 38 years and 3 months professional experience;

2.3.5. 'traffic organization officer' from the stepping-off shift at Dragoil station - employee of UDWGD Sofia at the National Railway Infrastructure Company – 5 years and 6 months professional experience;

2.3.6. 'switchman-level crossing supervisor' from the stepping off shift at Dragoman station - employee of UDWGD Sofia at the National Railway Infrastructure Company – 2 years and 3 months professional experience;

2.3.7. 'switchman-level crossing supervisor' from the overtaking shift at Dragoman station - employee of UDWGD Sofia at the National Railway Infrastructure Company – 10 years and 2 months professional experience;

2.3.8. 'switchman-level crossing supervisor' from the stepping off shift at Dragoil station - employee of UDWGD Sofia at the National Railway Infrastructure Company – 8 years and 10 months professional experience;

3. Physical condition of the officers involved in or related to the accident.

All officers who have had any relation to the accident have been granted the relevant length of rest time before taking office in accordance with the requirements of the Labour Code and Regulation # 50 dd. 28.12.2001 governing the work time of managing and subordinated personnel engaged in transport of passengers and freight on rail road, issued by the Minister of transport (promulgated in SG # 4 dd. 2002, as amended in SG # 46 dd. 2004; as amended in SG # 99 dd. 2006).

All officers involved in the accident have been given pre-shift briefing and they have declared that they were fit, rested and that they had not used alcohol or intoxicating substances. Before taking over their shifts, the engine teams have been tested for alcohol. The latter have been tested for alcohol also after the accident and the results are „0” ‰.

The concerned officers have passed a valid psychological test the results of which are still valid.

4. Documents certifying competence and capacity for holding the positions.

All officers involved in the accident possess the requisite documents for qualification, professional training for the respective position and certificates allowing them to occupy their position.

5. Actions carried out by the officers prior to and during the accident.

The officers involved in the accident (except the engine driver and the assistant engine driver of engine # 45-156, serving train # 293), have acted – before and during the accident – in total contradiction with the regulations for safety of train traffic. The acts of these officers are described in detail in item 11 of the report - Analysis of the causes of the railroad accident.

6. Circumstances preceding the accident relating to the track, safety equipment, contact network, rolling stock, etc.

At the time of the railway accident, the weather has been cloudy and rainy, with good visibility.

The track has been in good condition and does not have any relation to the causes of the accident.

The safety equipment in the two adjacent stations Dragoman and Dragoil and in the section between them has been in good working order and has no relation to the cause of the accident.

The contact network has been in good condition and does not have any relation to the causes of the accident.

Engine # 45-156 serving train # 293 and engine # 45-152 serving EST 10352 have been in good technical order of the chassis, breaking systems, lights and hooting systems in accordance with the technical norms and requirements.

The intercom and mobile communications have been in good operational order.

The grade of the track in the location of the accident is 22 ‰ downhill to Dragoil station and has no relation to the accident causes.

The organization of the traffic officer on duty at Dragoman station has contacted by the company mobile phone the engine driver of EAT # 10352 telling him to pull off the train. The engine driver has activated the automatic train breaks in ‘immediate stop’ mode at 7:54 AM and the train has stopped at km 47+796, 50 m before the warning traffic light of Dragoil station.

Train # 293 has passed transit through Dragoil station at 07:51 AM.

7. Compliance with the operating procedures and technologies within the system of the National Railway Infrastructure Company (NRIC) prior to and during the incident.

The procedures and operative technologies in Division “Management of Trains Traffic and Station Operations” – Sofia, which is in the structure of the National Railway Infrastructure Company, before and during the accident, as evident from the report of the operative group of the

investigating commission and the appendixes to it, the additionally requested materials and the confrontation between the persons involved in the accident have not been observed. The traffic organization officers on duty and the switch post personnel at Dragoman and Dragoil stations have failed fundamental rules of procedures and technology regulating the acceptance and dispatching of the trains at the stations.

8. Compliance with the operating procedures and technologies for servicing the rolling stock within the system of the carrier prior to and during the accident.

The engine driver of engine # 06-60 has pulled out from Dragoman station to Dragoil following only the permit of the exit traffic light, without having "Departure order" given with the truncheon of the traffic organization officer on duty.

EST # 10352 has had the relevant breaking mass and the requisite train documentation. During its trip, the train has not exceeded the maximum permitted speed of 65 km/h for the section between the stations. The engine crew has been equipped with a service mobile phone. The train has pulled out of Dragoman station under verbal agreement between the traffic organization officer first person and the engine driver of electric engine # 45-152 upon pull-out signal 'Order for departure' given with the signal truncheon of the traffic organization officer on duty, first person, despite the red lit of the exit traffic light for track four in the direction of Dragoil, this light meaning 'Stop! Exit not allowed! Passing behind the traffic light is forbidden!' without any written order for moving under special conditions given to the engine driver by the traffic organization officer on duty (Appendix # 15A to Art. 264, paragraph 1 of Regulation # 58 on the rules for technical operation, traffic of trains and signalling in the railroad transport, issued by the minister of transport).

Train # 293 has been ensured for the relevant breaking mass and has been supplied with the requisite train documentation. During its trip, the train has not exceeded the maximum permitted speed of 65 km/h for the section between the stations. The engine and service crews have been equipped with service mobile phones. The train has passed transit through Dragoil station at 7:51 AM. The readings of the tachometer tape indicate that the clock of electric engine # 45-156, servicing the train, has been 5 minutes late.

9. State of the railway infrastructure and rolling stock prior to, during and after the accident.

It was established that the railway infrastructure had been in good working order prior to, during and after the accident.

The electric engines and the cars in the compositions of trains # 293 and EST 10352 have been in good order.

10. Consequences of the accident.

10.1. Casualties – none;

10.2. Lightly injured – 30 persons:

- service personnel travelling to the place of their job – 14 persons, and 1 Serbian national – conductor in a sleeping car of train # 293;

- passengers – 15 persons, including 4 Serbian citizens;

10.3. Material damage:

- the accident caused material damage of both electric engines and the passenger cars, the value of which will be determined by independent valuator (the valuation will be presented in a separate report upon its submission by the valuator);

- railway infrastructure – none;

- contact network – none;

- other damages – none.

10.4. Stoppage of the traffic:

- between the stations Dragoman and Dragoil – from 07:57 until 14:05 hrs on 04.10.2010;

10.5. Resulting delay of trains:

- delayed trains - none
- cancelled - 1 train.

11. Analysis of the causes of the railway accident.

It is evident from the submitted documents that, during the takeover of duty between the old and the new shifts of traffic organization officers (first persons), at the Dragoman station (reported in the log Form DP-3) they have failed to record the actual occupation of tracks and the presence of trains and engines on the station. This incorrectly recorded information, the lack of visibility from the reception building of Dragoman station to the exit traffic lights of track four – the side to Dragoil (due to a sharp curve to the left) and the absence of the switchman at the post have created the premises for the resulting developments. The takeover document between the two traffic organization officers indicates the composition of EST # 10352 on track 4, but the presence of diesel engine # 06-60 on the same track in front of the train on the side to Dragoil is omitted. Exactly during the time of taking over of duty between the two traffic organization officers, the driver of diesel engine # 06-60, without waiting for permission and instruction from the traffic organization officer on duty (first person), has moved the diesel engine to the front distance sign so he would be able to see the exit traffic lights, probably expecting that engine # 06-60 (meant to travel as train # 11920) would depart before EST # 10352. The diesel engine has moved and stopped in front of the distance sign before the exit traffic lights of track four without passing behind it, but the engine has been invisible from the reception building of Dragoman station. Judging from the following actions of the traffic organization officer on duty (first person) at Dragoman station, who has already had taken over duty with his signature, we can conclude that he most probably has been unaware of the presence and location of the diesel engine. This is the only explanation why he has failed to follow the instructions of the train dispatcher, in the first minutes after he has taken over duty, to re-park the diesel engine on track five and provide it as supplementary at the tail of train # 44152. Hence, although the traffic organization officer from the previous shift has not informed his colleague taking the next shift about the diesel engine # 06-60, he has heard from the train dispatcher that this engine is in the station, but has not inquired about its location.

The further actions of the traffic organization officer on duty (first person), at Dragoman station are reduced to ensuring the trip of EST # 10352 which has already been made up on dispatching track four at Dragoman station. The traffic organization officer on duty, after making sure that the section to the next station Dragoil is unoccupied, has requested verbally and has received electronically a blocking signal 'permit granted' (PG) for reception of the train through the semiautomatic blockage system and has undertaken actions via the safety equipment at Dragoman station 'electromechanical centralization' (EMC) for ensuring the route of and dispatching EST # 10352. The traffic organization officer on duty has been unable to understand from the indication of the track control board of EMC that the diesel engine has been positioned in front of the train on the same track, as the red indicator on the track control board has indicated the occupied section, which in the case is the track occupied by the service train and the diesel engine. The traffic organization officer has opened the route by individually switching the shunts by use of their control levers and by this moment the semiautomatic blockage has still not been engaged and has been in 'normal state' indicated on the semiautomatic blockage panel in green not blinking light. After that, he has opened the exit traffic light from dispatching track four for train # 10352 by turning and fixing the track-signalling lever to 'exit' position at 90 degrees to Dragoil station. After opening of the exit signal, the semiautomatic blockage board has switched from 'normal state' to 'blocked in advance state' which is indicated by a red blinking light on the control board located in the room of traffic organization officer. The driver and the assistant driver of diesel engine # 06-60 have interpreted the permission indication of the exit traffic light as departure order, without getting departure order personally from the traffic organization officer on duty by indication with the signalling truncheon. They have probably been convinced that the permitting indication of the exit traffic light has been for them. This is the only explanation of why they have left the station without permission given personally by the traffic organization officer on duty with his signalling truncheon. The diesel engine has passed along

the exit traffic light and the latter has shut down automatically and the reporting track-signal board in the office of the traffic organization officer on duty has changed the indication from green to red light and the state of the semiautomatic blockage has switched from 'blocked in advance' to 'blocked' which is indicated by a stable red light and means that, should the semiautomatic blockage operates properly, the permission indication of the exit traffic light has been used by the passing vehicle (train) and the section between the stations is registered as busy. The EMC indication at Dragoil station has also changed from 'permit granted' to 'accepted departure'. By the time when the diesel engine was leaving the exit bottleneck of Dragoman station, the traffic organization officer on duty, being unaware of this fact, has gone to dispatch EST # 10352 in the same direction, having to present the train documentation to the engineer, check the clocks and sign the transport permit of the engine. By the time the traffic organization officer on duty has been presenting the train documentation, he has received information from the traffic organization officer on duty (second person) that the exit signal has been closed for EST # 10352 and the semiautomatic blockage has been engaged. The traffic organization officer on duty, without sending off the train, has returned to the control room and has personally verified the information and has probably has assumed that the shutting down of the exit signal and the activation of the semiautomatic blockage are due to malfunction of the security equipment, being unaware that the change in the status of the blockage equipment of the station and the section between the stations is not due to malfunction and has been normally activated by the diesel engine departed from the station. As the EE at Dragoman station has indicated busy track according to the control board of EMC at the time, it has been evident that the fore-section, i.e. track four, occupied by EST # 10352, has been busy. This is the only explanation why he has notified by phone the EE mechanics on duty for a failure. These actions confirm the commission's opinion that he has not had information about the diesel engine # 06-60 on the same track, immediately before the exit traffic light for track four from Dragoman to Dragoil. In the same time, no switchman has been present on the switching post and the traffic organization officer on duty had no opportunity of receiving verbal report from the switchman about the train (engine) which had left the station. The traffic organization officer on duty has probably made an effort to reopen the exit traffic light but, even if he had, the semiautomatic blockage would not permit opening an exit traffic light when the section between the stations is occupied. This is firm evidence that the semiautomatic blockage has been in good order by the time. Remaining with the impression that there is a failure of the ensuring equipment, he has returned to the engine crew of EST # 10352 to convince them to depart at closed exit traffic light on the route prepared for them and unoccupied section between the stations, without checking by phone and without presenting them an order for trip under special conditions Form II-A. These actions of his are in total contradiction with Regulation # 58 on the rules for technical operation, train traffic and signalling in the railway transport issued by the Minister of transport and "Rules for the train traffic and shunting in railway transport" (RTTS), approved by the General Director of the NRIC, which defines the obligations of the traffic organization officer on duty regarding the safety of train trips in case of failure of the EE and the semiautomatic blockage. The engine crew of EST # 10352 inexplicably agrees with the proposal to pull out at closed exit signal and without written order Form II-A. Probably the circumstance that this train has always pulled out from this track on its usual time and without any specific events explains to a certain extent why the driver and the assistant driver of the engine have decided to comply with the request of the traffic organization officer on duty to depart at closed exit signal without requiring from him order form II-A. After EST # 10352 departs from Dragoman station only under order given with the signalling truncheon by the officer on duty, the latter has gone back to the control room, following the train's leave on the EE indicator, and has announced the train's departure to Dragoil station, not being aware by that time that the inter station section has already been occupied by the diesel engine which has departed earlier. By the time EST # 10352 has departed, the switchman has also not been present at the switch point to report verbally to the traffic organization officer on duty.

The traffic organization officer on duty at Dragoil station, after recording the telephoned message concerning the departure of EST # 10352 from Dragoman, has taken action to clear the route of its transit and opens the entry signal to track two, unaware that diesel engine # 06-60 was moving ahead of EST # 10352. Until this time, the traffic organization officer on duty has had no way of knowing that the diesel engine would enter the station instead of EST 10352. She has waited the

entering EST # 10352, according to her conviction, to unlock the entry route (which happens after release of the internal isolated section of track two), seen by her on the light indication of the EMC, and immediately after that event she has reset the semiautomatic blockage by the button 'track arrival' (TA) without meeting the arriving train and without having verbal report from the switchman on duty at the post at the Dragoman side concerning the integrity of EST 10352. These acts of hers are in violation of the applicable regulations of the RTTS which provide for banning of operations on track arrival if the traffic organization officer on duty has not unambiguously ensured that the train has arrived at the station in its integrity, the section between the stations is unoccupied and there are no obstacles to the safe movement of the next vehicles. Had the traffic organization officer on duty, personally or on grounds of the report of the switchman, established that engine # 06-60 had entered on track two of Dragoil station at that time instead of the expected EST # 10352, the preconditions for railroad accident created until this moment might not lead to its actual happening. The next actions of the traffic organization officer on duty consist of clearing the transit route of international fast train # 293 through receiving/dispatching track one in the direction of Dragoman station. Here, it is not clear how has she requested and received approval of its movement coordination with the next station of Dragoman – under condition (by receiving 'counterpart approval' CA) or after normalization of the semiautomatic blockage by use of the 'TA' button. After arranging the transit route for train # 293, she has gone outdoors to transit it and not earlier than the passing of the train's last carriage she has noticed that diesel engine # 06-60 had already parked on track two of the station. Then she has contacted the traffic organization officer on duty at Dragoman station to report the passing of train # 293 and reporting in the mean time that a diesel engine has arrived instead of EST# 10352. Following this call, the personnel of both stations have realized their error of letting two trains running frontally against each other, the traffic organization officer on duty at Dragoman station immediately dials from his office mobile phone the number of the engineer of EST # 10352 instructing him to stop the train, and has requested via the train dispatcher the cut down of the current in the contact grid, which has consequently been done. These actions have been entirely adequate with view of the circumstances and the provisions of the RTTS, yet they were not sufficient to prevent the collision of the two trains. Meanwhile, the traffic organization officer on duty at Dragoil station has not undertaken any actions to alarm the engineers to stop the already exiting the station international train. The commission's position is that not all possible modes of emergency stopping of both trains have been applied in accordance with the RTTS which regulates the actions to be taken in emergency situations. The two trains, moving one facing the other, have collided shortly before the warning traffic light of Dragoil station, resulting in the railway accident. At the moment of the frontal collision of the two trains (one of which has already been stopped), the kinetic energy of the moving train has, anyway, become a destructive force causing heavy material damage and injury of many people.

The conclusion of this analysis is that technical failure is definitely ruled out and the human factor has been crucial. The statistics show that, fifty years ago, ninety percent of the serious railway accidents have resulted from technical failures and damages, while currently every nine of ten accidents are caused by human errors. With automation, a large part of operator actions are conferred to technology, yet it is not reliably fit to extraordinary situations, and this is when the worst railway accidents occur. Often there is unavailability of experienced personnel capable of quick and adequate intervention and solutions for preventing an accident.

12. Causes of the accident.

Basic regulatory provisions governing the safe reception and dispatching of trains at railway stations have been violated by the executive personnel of SC NRIC at the stations of Dragoman and Dragoil, and the executive personnel of BDZ EAD at the Engine Yard – Sofia.

1. The traffic organization officer on duty – first person, old shift, at Dragoman station has violated the RTTT Art. 97, paragraph 2 and Art. 264, paragraph 1;
2. The traffic organization officer on duty (first person) new shift, at Dragoman station has violated Regulation # 58, Art. 132, paragraph 1, Art. 264, paragraph 1, item 2 of the RTTS, Art. 397, item 4 and Art. 9, Art. 149, paragraph 2, Art. 264, paragraph 1, Art. 344, paragraph 2 and Art. 359, paragraph 1;

3. The traffic organization officer on duty at Dragoil station has violated Regulation 58, Art. 274, paragraph 1 and Art. 397, item 5 of the RTTS, Art. 9, Art. 145, paragraph 2, Art. 346, paragraph 1 and Art. 387, paragraph 4;
4. The assistant driver of engine # 45-152 has violated Regulation # 58, Art. 263, paragraph 2, Art. 275, paragraph 3, Art. 286, Art. 288, Art. 291, item 2 of the RTTS, Art. 332, item 1 and Art. 344, paragraph 2 and Art. 384, paragraph 3;
5. The driver of engine # 45-152 has violated Regulation # 58, Art. 263, paragraph 2, Art. 275, paragraph 3, Art. 286, Art. 288, Art. 291, item 2 and Art. 332, item 1 of the RTTS, Art. 344, paragraph 2 and Art. 384, paragraph 3;
6. The driver of engine # 06-60 has violated Regulation # 58, Art. 263, items 1 and 2, Art. 275, item 4, Art. 86, Art. 288 and Art. 397, item 4, letter 'd' of the RTTS, Art. 344, paragraph 2 and Art. 384, paragraph 4;
7. The switchman/level crossing keeper, old shift, at Dragoman station has violated the RTTS Art. 97, paragraph 2 and paragraph 4;
8. The switchman/level crossing keeper, new shift at Dragoman station has violated the RTTS Art. 97, paragraph 2 and paragraph 4.

13. Recommendations and proposals for measures preventing other similar accidents.

1. During the investigation of the railway accident, immediate recommendations have been given to the Executive Director of 'RA' EA, the General Director of NC NRIC and the Executive Director of BDZ EAD as follows:

- 'RA' EA (Railway Administration Executive Agency) should order a special inspection on the compliance with the regulations on the safety procedures in railway transport concerning the process of handover of duty by the traffic organization officers and the engine crews, as well as the documentary recording of facts and circumstances;

- 'RA' EA shall require preparation and introduction of emergency measures cards describing the sequence of actions by traffic organization officers and engine crews in occurrence of direct threat of railway accident;

- the 'RA' EA shall organize a training seminar with the traffic organization officers and engine crews for action in cases of possible railway accident. The attendance of officers should be recorded in a protocol;

- the 'RA' EA shall require a review of the procedure for use of service telephones and radio communications and shall order their use only for official calls;

- the 'RA' EA shall order the creation of a map for the areas of stations and inter station sections which are out of range and inaccessible for communication by radio or GSM between the traffic control officer and the engine driver.

Letter # 10-22-1094/01.11.2010 by the Executive Director of 'RA' EA notifies the Director of the Directorate for Aircraft, Maritime and Railway Accident Investigation at the Ministry of Transport, Information Technology and Communications regarding the implementation of urgent safety measures and the terms for their implementation.

2. The General Director of NRIC and the Executive Director of BDZ EAD shall, in conformity with the applicable Safety Management Systems (SMS) perform periodical unexpected checks of the operational personnel during the time of taking over duty shifts at the work stations.

3. The General Director of NRIC shall undertake relevant measures towards alteration of Plan II-24 for receiving and dispatching the employee service train at Dragoman station from a track with a duplicated traffic light at the exit with a platform for the personnel who travel every day from and to Dimitrovgrad RS.

The Railway Administration Executive Agency shall, not later than 10.12.2010, inform in writing the Directorate for Aircraft, Maritime and Railway Accident Investigation at the Ministry of Transport, Information Technology and Communications about the measures taken for prevention of accidents of similar nature.

Attachment: Photographs – 6 pieces

Chairman:

signature illegible (Boycho Skrobanski)
Chief inspector at DAMRAI with MTITC

Members:

1. *signature illegible (Ivan Lalov)*
Head of Department at the 'RI' DG with the 'RA' EA
2. *signature illegible (Valentin Tzankov)*
Chief Inspector at the 'RI' DG with the 'RA' EA
3. *signature illegible (Yavor Minev)*
Chief Inspector at the MRI Sofia with 'RA' EA
4. *signature illegible (Geno Genov)*
Chief Expert at the 'RI' DG with 'RA' EA

I, the undersigned, Stefan Pavlov Velichkov certify the truthfulness of the translation made by me from Bulgarian into English of the enclosed document – Final report. The translation consists of 11 pages.

Sworn translator:
Stefan Pavlov Velichkov